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ABSTRACT

The purpose of this study was to validate the Prescriptive Instructional Program for Educational Readiness (PIPER) for utilization as a criterion referenced test (CRT) among learning disabled children. The program consisted of behavioral objectives and diagnostic and/or mastery tasks and activities for each objective in the area of gross motor control, visual motor processes, auditory processes, language skills, and reasoning abilities. The participants included 181 children, aged six to eight, who were receiving supplementary instruction in a Title I Bridge to School Program. Findings included: (1) test-retest and interrater reliabilities are high; (2) use of performance tasks gives the teachers objective information for rating children; (3) the PIPER "tests" are generally sensitive to instruction; (4) comparison with the Metropolitan Readiness Test is unsatisfactory; and (5) further research to determine concurrent validity is required. A follow-up validation of the PIPER involved 78 of the children who had received Title I supplementary instruction the previous year and were known to the teacher rater. The data did not support use of the PIPER since its validity was highly questionable. (RL)

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VALIDATION OF A CRITERION REFERENCED TEST FOR YOUNG HANDICAPPED CHILDREN: PIPER

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VALIDATION OF PIPER

Measurement of student growth is a mandated activity in funded programs. The selection of instruments to determine growth is particularly important. Use of instruments with unknown reliability and validity result in data that have questionable reliability and validity and also lack interpretability.

It is widely recognized that there is a scarcity of instruments to determine growth in young handicapped children. The Bridge to School Program, a Title I program serving eligible learning disabled children, aged six to eight who participate in the Readiness Program, had used the Metropolitan Readiness Test but found it unsatisfactory. The norms were not appropriate for handicapped children. Moveover, pre and post measurement was inadequate for providing information to teachers that would help in determining individual instructional needs.

The Prescriptive Instructional Program for Educational Readiness (PIPER), published by Readers' Digest, was selected to implement the Bridge's curriculum. It is a diagnostic prescriptive approach for individualized readiness instruction, with emphasis on language development. The program consists of behavioral objectives and diagnostic and/or mastery tasks and activities for each objective in the area of gross motor control, visual motor processes, auditory processes, language skills, and reasoning abilities. These are presented in five sets of individual booklets and supplementary materials entitled, respectively, Willows, Windows, Waves, Whispers and Wonders.

Readers' Digest could not provide reliability or validity data for the PIPER. It was, therefore, necessary to undertake validation procedures to determine the reliability and validity of the PIPER for use as a criterion referenced test (CRT) among learning disabled children.

Statement of the Problem

The purpose of this study was to validate the PIPER for utilization as a CRT to evaluate the Bridge program. Specifically, answers were sought to the following questions:

1. What is the reliability of PIPER objective tests?

2. How do PIPER objective test scores compare to teacher judgement for each objective?

3. What is the concurrent validity of PIPER objective tests and the Metropolitan Readiness Test (MRT)?

4. How sensitive are the PIPER objective tests of mastery to instruction?

Method

Subjects The participants in this validation study consisted of 181 children who attended the Readiness program and received supplementary instruction in the Bridge Program for most of the 1978-79 school year. They were located in four boroughs of New York City.

Materials. Each section of the PIPER was used in the validation. Objectives in laterality, directionality, and sensory usage were selected in gross motor control. Objectives in form constancy, figure ground, spatial relationships and visual memory were selected in visual motor processes. In auditory processes, selected objectives included discrimination, figure ground, and sound blending. In language skills, selected objectives were those in the area of vocabulary development, usage and symbolization. All the objectives in reasoning abilities were selected. Selected objectives were at levels 1, 2 or 3. The objectives for which tests of mastery were validated appear in Table I.

SELECTED PIPER OBJECTIVES

Willows: Gross Motor Control

Laterality

Identifies left and righ sides of body
Positions body under, on top of, between, in front of, behind, beside objects
Positions body to the left or right of object

Directionality

Copies chalkboard circle/double circle
Copies chalkboard lateral/vertical lines
Sorts by concept of left and right
Completes directional hand/foot movements
Follows pegboard/paper directional tasks

Sensory Usage

Names objects using senses
Gives sensory description of objects
Compares/classifies by senses

Windows: Visual Motor Processes

Form Constancy

Sorts by color
Sorts by texture
Sorts by size
Sorts by shape and pattern

Figure Ground

Completes missing part pictures
Finds hidden figures in drawings

Spatial Relationships

Fits forms in formboard
Reproduces two dimensional block designs
Reproduces three-dimensional block designs
Reproduces head patterns
Reproduces parquetry patterns
Reproduces pegboard patterns
Completes maze pathways
Assembles puzzles (strip/interlocking)

Visual Memory

Recalls familiar objects
Recalls familiar shapes
Draws shapes from recall
Draws patterns from recall
Resequences objects from memory
Resequences colors from memory
Copies exercise in sequence shown
Reproduces bead patterns from memory
Reproduces block designs from memory

Waves: Auditory Process

Discrimination

Identifies rhyming words
Identifies same/different word beginnings
Identifies same/different word endings
Identifies same/different medial sounds

Memory

Follows one-task directions
Follows two-task directions in sequence
Follows three task directions in sequence
Recreates a sequence of instrumental sounds
Copies clapping/buzzboard patterns
Repeats six work sentences
Answers who/what/where/when questions about a selection

Figure ground

Responds to key word against background noise
Supplies missing sound of dictated word

Sound blending

Blends syllables into words:
Blends letter sounds into words

Whispers: Language Skills

Vocabulary Development

Identifies objects as same or different
Names groups as more or less
Names objects presented in categories
Matches and names colors
Names basic shapes
Names positional concepts
Names oppositional traits and objects
Defines objects in terms of use
Recognizes multiple meaning of words

Usage

Speaks in complete sentences
Counts objects
Uses pronouns correctly in speech
Uses tenses correctly in speech
Uses plurals correctly in speech
Can tell experience story to teacher

Symbolization

Matches letters to model of name
Reads "yes" "no"
Gives sounds for selected letters
Reads names of basic shapes
Reads room labels
Reads pictured action words
Reads color words
"Reads" experience story

Wonders: Reasoning Abilities

Learns through imitation: repeats model
Learns by rote: repeats three facts
Gives three facts about given experience
Matches associated objects or events
Matches related pairs of objects or events
Sequences three-four events in logical order
Defines objects by their descriptive traits
Categorizes/classifies objects and ideas
Generalizes from familiar objects and events
Makes comparisons based on fact
Utilizes facts to propose alternatives
Utilizes facts to make inferences
Reasons inductively
Reasons deductively
Analyzes facts to make objective choices

The MRT, Level 1, Form P was used to determine concurrent validity of the PIPER.

Procedure. Validation consisted of four components for each "test": (1) Each "test" was subjected to test-retest or interrater reliability. Where performance was highly dependent on subjective judgement, two ratings of the same performance were obtained, one by the regular Readiness teacher, the other by the Bridge teacher. For all other "tests," two independent evaluations were made by the Bridge teacher, each separated by a one-week interval. Designation of reliability methodology appears on the appended data collection form. (2) Comparisons of pretest scores were made with teacher judgements. Classroom teachers who did not know the child's record on the PIPER and who were unfamiliar with the procedures for determining mastery, rated the child on his or her ability to perform the objective. (3) Comparisons of posttest scores of children instructed in objectives and MRT scores were made to determine concurrent validity. (4) Among children who had not mastered an objective, a comparison of the scores of those who were instructed in the objective was made with the scores of children who were not instructed in the objective in order to determine the "test's" sensitivity to instruction. The following activities were undertaken to implement the components.

A teacher workshop was held in early November to select the objectives of the program and to review how to test for mastery of each selected objective. Immediately following the workshop, Bridge teachers shared the list of objectives with the regular Readiness teacher who was asked to assess each child in the program as to his or her ability to perform the objective (component 2). Bridge teachers obtained the first pretest scores for objectives designated as test-retest items. They then determined mastery/nonmastery of objectives requiring two simultaneous ratings; to obtain two independent judgements, both the Bridge and Readiness teachers observed together the child's performance on the PIPER "test." The second pretest score was then obtained for test-retest

objectives (component 1). All pretest data were obtained by the end of November.

Teachers randomly divided children who needed instruction in a specific objective into two groups, experimental and control; the children in the experimental group were instructed in the objective, whereas the children in the control group did not receive instruction in that objective, but received instruction in another objective in which they were deficient. Thus, children were experimental for some objectives at the same time they were control for others. When teachers determined that children in the experimental group were ready for posttesting, post-tests were administered to both experimental and controls. These procedures were implemented in an ongoing manner throughout the school year (component 4).

In May another workshop was held to distribute data collection forms and explain how to complete them. During the last two weeks in May the MRT was administered to a randomly selected sample of Bridge children and scored (component 3). All data were placed on the specially designed forms and submitted them to the coordinator in June for transmittal to the evaluator. Forms were sent to a computer center for keypunching.

Statistical Procedures. Reliability was determined for each objective by computing phi coefficients for test-retest or interrator sets of scores. Validity was ascertained through phi coefficients, point biserial correlations, and chi square. Phi coefficients were computed to determine the relationship between teacher judgement and the PIPER. Concurrent validity was determined by conducting point biserial correlations for each objective, using each subtest and total MRT score and experimental posttest PIPER scores for each objective. Differences between experimental and control groups were analyzed by chi square, where N's were greater than 20, and Fischer's exact probability where N's were less. Significance was accepted at the .05 level. All analyses were conducted using SPSS.

Findings

Reliability. PIPER objective "tests" appear to have high reliability. No phi coefficient was smaller than .82. Moreover, for some constructs, the variability was less than .05 and most coefficients were greater than .95.

Regardless of method to determine reliability, test-retest or interrater, the consistency of response was high.

See Table II

TABLE 12

RELIABILITY

Waves: Auditory Processes	ρ (N=161)	Method: Test/Retest - 1 Interrator - 2
Identifies rhyming words	.98	1
Identifies same/different word beginnings	.[illegible]	1
Identifies same/different word endings	.83	1
Identifies same/different medial sounds	1.00	1
Memory		
Follow one-task directions	.89	2
Follow two-task directions in sequences	.96	2
Follow three-task directions in sequences	.93	2
Recreates a sequence of instrumental sounds	.94	2
Copies classping/buzzboard patterns	.92	1
Repeats six word sentences	.94	2
Answers who/what/where/when questions about a selection	.96	2
Figure ground		
Responds to key word heard against background noise	.97	2
Supplies missing sound of dictated word	.99	1
Sound blending		
Blends syllables into words	.99	1
Blends letter sounds into words	.98	1

Whispers: Language Skills		
Vocabulary Development		
Identifies objects as same or different	.93	1
Names groups as more or less	.94	1
Names objects presented in categories	.85	1
Matches and names colors	.90	1
Names basic shapes	.90	1
Names positional concepts	.85	1
Names oppositional traits of objects	1.00	1
Defines objects in terms of use	.91	1
Recognizes multiple meanings of words	.77	1
Usage		
Speaks in complete sentences	.87	1
Counts objects	.92	1
Uses pronouns correctly in speech	.91	1
Uses tenses correctly in speech	.88	1
Uses plurals correctly in speech	.91	1
Can tell experience story to teacher	.90	2
Symbolization		
Matches letters to model of name	.82	2
Reads "yes" and "no"	.94	1
Gives sounds for selected letters	.97	1
Reads names of basic shapes	.94	1
Reads room labels	.91	1
Reads pictured action words	.90	1
Reads color words	.92	1
"Reads" experience story	.93	2

Wonders: Reasoning Abilities		
Learns through imitation: repeats model	.98	1
Learns by rote: repeats three facts	.93	1
Gives three facts about given experience	.94	2
Matches associated objects or events	.99	1
Matches related pairs of objects or events	.99	2
Sequences three four events in logical order	1.00	1
Defines objects by their descriptive traits	.99	2
Categorizes/classifies objects and ideas	.96	1
Generalizes from familiar objects and events	.96	1
Makes comparisons based on fact	.98	2
Utilizes facts to propose alternatives	.98	2
Utilizes facts to m[illegible] inferences	.97	2
Reasons inductively	.95	2
Reas[illegible]ng deductively	.87	2
Analyzes facts to make objective choices	.87	2

Willows: Gross Motor Control	ρ (N=161)	Method: Test/Retest - 1 Interrater - 2
Laterality		
Identifies left and right sides of body	.97	1
Positions body under, on top of, between, in front of, behind, besides objects	.97	1
Positions body to the left or right of object	.96	1
Directionality		
Copies chalkboard circle/double circle	.98	2
Copies chalkboard lateral/vertical lines	.97	2
Sorts by concept of left and right	.94	1
Completes directional hand/foot movements	NA	2
Follows pegboard/paper directional tasks	NA	1
Sensory Usage		
Names objects using senses	.[illegible]	1
Gives sensory description of objects	.91	1
Compares/classifies by senses	.93	1

Windows: Visual Motor Processes		
Form Constancy		
Sorts by color	.95	1
Sorts by texture	.98	1
Sorts by size	.98	1
Sorts by shape and patterns	.98	1
Figure Ground		
Completes missing pa[illegible] pictures	.98	1
Finds hidden figures [illegible] drawings	.95	1
Spatial Relationships		
Fits forms in formboard	.83	1
Reproduces two-dimensional block designs	.94	1
Reproduces three-dimensional block designs	.95	1
Reproduces head patterns	.95	1
Reproduces parquetry patterns	.95	1
Reproduces pegboard patterns	.91	1
Completes maze pathways	.97	1
Assembles puzzles (strip/interlocking)	.93	1
Visual Memory		
Recalls familiar objects	.98	1
Recalls familiar shapes	.97	1
Draws shapes from recall	1.00	1
Draws patterns from recall	.99	1
Resequences objects from memory	.96	1
Resequences colors from memory	.98	1
Copies exercises in sequence shown	.99	1
Reproduces bead patterns from memory	.96	1
Reproduces block designs from memory	NA	1

Validity There was little agreement between teacher judgment and PIPER scores. Phi-coefficients ranged from .02 to .52. Fourteen of the coefficients were nonsignificant.

Discrepancies between classroom teacher judgment and PIPER "test" results were most likely based upon the subjective nature of teacher judgment; classroom teachers did not generally base their evaluation on performance tasks. Moreover, the teachers were not knowledgeable about the children's abilities, since they had only recently been placed in their class. These data are presented in Table III.

TABLE III VALIDITY: Teacher Judgment and PIPER

OBJECTIVES (N=181)	ϕ	
Willows: Gross Motor Control		
Laterality		
Identifies left and right sides of body	.45	
Positions body under, on top of, between in front of, behind, besides objects	.35	
Positions body to the left or right of object	.52	
Directionality		
Copies chalkboard circle/double circle	.02	NS
Copies chalkboard lateral/vertical lines	.17	
Sorts by concept of left and right	.33	
Completes directional hand/foot movements	.20	
Follows pegboard/paper directional tasks	.23	
Sensory Usage		
Names objects using senses	.18	
Gives sensory description of objects	.35	
Compares/classifies by senses	.18	
Windows: Visual Motor Processes		
Form constancy		
Sorts by color	.17	
Sorts by texture	.19	
Sorts by size	.07	NS
Sorts by shape and pattern	.24	
Figure ground		
Completes missing part pictures	.16	
Finds hidden figures in drawings	.23	
Spatial relationships		
Fits forms in formboard	.08	NS
Reproduces two-dimensional block designs	.28	
Reproduces three-dimensional block designs	.49	
Reproduces head patterns	.2[illegible]	
Reproduces parquetry patterns	.16	
Reproduces pegboard patterns	.12	NS
Completes maze pathways	.29	
Assembles puzzles (strip/interlocking)	.04	NS
Visual memory		
Recalls familiar objects	.28	
Recalls familiar shapes	.20	
Draws shapes from recall	.33	
Resequences objects from memory	.11	NS
Resequences colors from memory	.05	NS
Copies exercises in sequence shown	.34	
Reproduces bead patterns from memory	.11	NS
Reproduces block designs from memory	.38	
Draws patterns from recall	.37	
Waves: Auditory Processes		
Discrimination		
Identifies rhyming words	.34	
Identifies same/different word beginnings	.32	
Identifies same/different word endings	.06	NS
Identifies same/different medial sounds	.09	NS
Memory		
Follow one-task directions	.30	
Follow two-task directions in sequences	.21	
Follow three-task directions in sequences	.36	
Recreates a sequency of instrumental sounds	.15	NS
Copies clapping/buzzboard patterns	.07	NS
Repeats six word sentences	.43	
Answers who/what/where/when questions about a selection	.15	NS
Figure ground		
Responds to key word heard against background noise	.25	
Supplies missing sound of dictated word	.33	
Sound blending		
Blends syllables into words	.18	
Blends letter sounds into words	.19	

OBJECTIVES (N=181)	ϕ	
Whispers: Language Skills		
Vocabulary Development		
Identifies objects as same or different	.23	
Names groups as more or less	.27	
Names objects presented in categories	.36	
Matches and names colors	.35	
Names basic shapes	.13	NS
Names positional concepts	.35	
Names oppositional traits of objects	.25	
Defines objects in terms of use	.28	
Recognizes multiple meanings of words	.10	NS
Usage		
Speaks in complete sentences	.25	
Counts objects	.27	
Uses pronouns correctly in speech	.28	
Uses tenses correctly in speech	.28	
Uses plurals correctly in speech	.35	
Can tell experience story to teacher	.30	
Symbolization		
Matches letters to model of name	.45	
Reads "yes" and "no"	.30	
Gives sounds for selected letters	.35	
Reads names of basic shapes	.33	
Reads room labels	.16	
Reads pictured action words	.38	
Reads color words	.44	
"Reads" experience story	.[illegible]	
Wonders: Reasoning Abilities		
Learns through imitation: repeats model	.40	
Learns by rote: repeats three facts	.50	
Gives three facts about given experience	.49	
Matches associated objects or events	.39	
Matches related pairs of objects or events	.40	
Sequences three four events in logical order	.33	
Defines objects by their descriptive traits	.34	
Categorizes/classifies objects and ideas	.44	
Generalizes from familiar objects and events	.33	
Makes comparisons based on fact	.36	
Utilizes facts to propose alternatives	.25	
Utilizes facts to make inferences	.32	
Reasons inductively	.37	
Reasons deductively	.38	
Analyzes facts to make objective choices	.19	

The Piper Tests were sensitive to instruction. Every chi square was significant ($p < .05$). Proportionately more Fischer Exact Probabilities were significant than not.

See Tables IV and V.

VALIDITY TABLE IV

Objectives	SENSITIVITY TO INSTRUCTION % MASTERY AFTER INSTRUCTION %	N	% MASTERY -NO INSTRUCTION %	N	χ^2
Waves: Auditory Processes					
Discrimination					
Identifies rhyming words	77	60	22	41	27.24
Identifies same/different word beginnings	88	69	12	67	76.49
Identifies same/different word endings	92	24	15	33	29.63
Identifies same/different medial sounds	93	14	16	19	16.21
Memory					
Follow one-task directions	100	23	47	17	12.80
Follow two-task direction in sequences	100	39	18	22	41.42
Follow three-task direction in sequences	89	36	11	35	39.56
Recreates a sequence of instrumental sounds	79	19	0	12	15.33
Copies clapping/buzzboard patterns	51	35	22	32	5.04
Answers who/what/where/when questions about a selection	84	37	16	25	25.19
Whispers: Language Skills					
Vocabulary Development					
Identifies objects as same or different	86	22	25	16	12.14
Names groups as more or less	96	22	36	14	12.39
Names objects presented in categories	96	28	35	26	20.48
Matches and names colors	90	20	21	19	16.14
Names basic shapes	91	57	22	46	48.44
Names positional concepts	96	47	14	36	53.66
Names oppositional traits of objects	82	33	9	35	34.05
Usage					
Speaks in complete sentences	83	24	6	18	21.88
Counts objects	92	39	23	35	34.08
Uses pronouns correctly in speech	89	28	25	37	22.41
Symbolization					
Gives sounds for selected letters	91	45	19	43	43.95
Reads room labels	100	17	0	14	27.09
Reads color words	100	28	0	28	52.07
Wonders: Reasoning Abilities					
Learns by rote: repeats three facts	92	37	22	23	27.68
Gives three facts about given experience	100	28	0	20	43.97
Matches associated objects or events	89	27	13	15	20.25
Sequences three four events in logical order	100	43	6	33	64.39
Willows: Gross Motor Control					
Laterality					
Identifies left and right sides of body	90	31	15	27	30.28
Positions boy under, on top of, between in front of, behind, besides objects	97	39	3	30	57.33
Directionality					
Sorts by concept of left and right	96	27	0	21	40.33
Completes directional hand/foot movements	83	23	21	19	13.53

Windows: Visual Motor Processes	SENSITIVITY TO INSTRUCTION % MASTERY AFTER INSTRUCTION %	N	% MASTERY -NO INSTRUCTION %	N	χ^2
Form Constancy					
Sorts by size	96	27	38	16	15.29
Sorts by shape and pattern	100	24	45	20	14.79
Figure Ground					
Completes missing part pictures	95	37	25	32	32.49
Spatial Relationships					
Reproduces two-dimensional block designs	96	23	25	24	21.50
Reproduces bead patterns	91	32	18	28	29.31
Reproduces parquetry patterns	93	28	10	20	29.63
Completes maze pathways	77	17	6	17	14.69
Visual Memory					
Recalls familiar objects	91	33	16	19	26.19
Recalls familiar shapes	91	21	24	17	14.93
Resequences objects from memory	83	24	0	24	30.94
Reproduces bead patterns from memory	90	19	0	18	26.30

VALIDITY TABLE V

Objectives	SENSITIVITY TO INSTRUCTION % MASTERY AFTER INSTRUCTION %	N	% MASTERY - NO INSTRUCTION %	N	FISCHER'S EXACT PROBABILITY
Willows: Gross Motor Control					
Laterality					
Positions body to the left or right of object	92	13	38	16	.00
Directionality					
Copies chalkboard circle/double circle	86	7	25	4	.09 NS
Copies chalkboard lateral/vertical lines	100	4	0	3	.03
Follows pegboard/paper directional tasks	100	12	9	11	.00
Sensory Usage					
Names objects using senses	100	15	25	8	.00
Gives sensory description of objects	89	9	0	4	.01
Compares/classifies by senses	100	2	0	4	.07 NS
Windows: Visual Motor Processes					
Form constancy					
Sorts by color	100	9	33	3	.05
Sorts by texture	90	10	0	5	.00
Figure ground					
Finds hidden figures in drawings	100	11	13	8	.00
Spatial Relationships					
Fits forms in formboard	100	1	0	1	.50 NS
Reproduces three-dimensional block designs	100	9	0	11	.00
Reproduces pegboard patterns	100	11	0	12	.00
Assembles puzzles (strip/interlocking)	100	12	9	11	.00
Visual Memory					
Draws shapes from recall	82	11	0	8	.00
Draws patterns from recall	100	16	25	12	.00
Resequences colors from memory	94	16	29	14	.00
Copies exercises in sequence shown	100	4	0	5	.01
Reproduces block designs from memory	100	6	0	3	.01
Waves: Auditory Processes					
Memory					
Repeats six word sentences	89	9	0	12	.00
Figure ground					
Responds to key word heard against background noise	100	6	0	4	.00
Supplies missing sound of dictated word	100	3	0	3	.05
Sound blending					
Blends syllables into words	100	8	0	8	.00
Blends letter sounds into words	100	11	10	10	.00
Whispers: Language Skills					
Vocabulary Development					
Defines objects in terms of use	100	12	8	12	.00
Recognizes multiple meanings of words	100	11	0	8	.00
Usage					
Uses tenses correctly in speech	92	12	0	11	.00
Uses plurals correctly in speech	91	11	27	11	.00
Can tell experience story to teacher	100	16	20	10	.00
Symbolization					
Matches letters to model of name	91	11	20	5	.01
Reads "yes" and "no"	100	11	0	8	.00
Reads names of basic shapes	80	5	0	4	.04
Reads pictured action words	100	7	20	5	.01
"Reads" experience story	100	9	20	10	.00
Wonders: Reasoning Abilities					
Learns through imitation: repeats model	71	7	57	7	.50 NS
Matches related pairs of objects or events	78	9	0	11	.00
Defines objects by their descriptive traits	85	13	9	11	.01
Categorizes/classifies objects and ideas	89	9	36	11	.02
Generalizes from familiar objects and events	100	1	100	1	NA
Makes comparisons based on fact	100	7	0	9	.00
Utilizes facts to propose alternatives	75	4	0	5	.05
Utilizes facts to make inferences	100	1	25	4	.40 NS
Reasons inductively	100	1	0	4	.20 NS
Reasons deductively	100	4	40	5	.12 NS
Analyzes facts to make objective choices	0	0	100	1	NA

Concurrent Validity

Estimates of concurrent validity as designed in the proposal could not be obtained. The data collected on post test mastery after instruction was for experimentals only, which decreased the sample of students for whom MRT scores and objective mastery were available. N's became so small that correlations could not be conducted. The independent variable was then changed to number of objectives mastered on each section of the test in order to differentiate the children who appeared to be "better" learners. The specific objectives mastered were diverse because of the procedure of selecting children into experimental and control groups simultaneously. The amount of learning as indicated by number of objectives mastered was limited by this very same procedure.

The reason for theorizing a positive relationship between number of objectives mastered and the MRT is questionable, even without the limitations discussed above. Results indicated that about one-fourth of the correlations were significantly different from zero. The positive correlations were of low magnitude, indicating a common variance of no more than 10% between the MRT and the number of objectives mastered. Mastery of Waves objectives was most closely related to the MRT which appears to reinforce the auditory emphasis of this readiness test. See Table VI.

TABLE VI
PEARSON CORRELATION COEFFICIENTS BETWEEN NUMBER OF OBJECTIVES MASTERED AND MRT

: :	MRT 1	MRT 2	MRT 3	MRT 4	MRT 5	MRT 6	MRTOT
WILLOWS	0.0406	0.0841	0.1775*	0.0245	0.0398	-0.0331	0.0914
WINDOWS	0.1835*	-0.0316	0.0901	-0.0512	0.0320	0.0346	0.0867
WAVES	0.1056	0.2078*	0.2544*	0.2073*	0.2903*	0.2127*	0.3291*
WHISPERS	0.0668	0.1704*	0.0363	0.1368	-0.0213	0.0402	0.1186
WONDERS	0.1044	0.1323	0.1119	-0.0503	0.0072	0.0435	0.1044
TOTAL:	0.1620	0.1833*	0.2106*	0.0967	0.1088	0.0952	0.2352*

(N=90)

*p≤.05

(Coefficient/ (Cases)/Significance (A value of 99.0000 is printed if a coefficient cannot be computed

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Fordham University ****** SPSS-20, Release 7.02A (14-Feb.-79) 29-Sep.-79
CPU time required: 2.06 seconds.

Conclusions

Test - retest and interrater reliabilities are high. Use of performance tasks gives the teachers objective information for rating children. The "tests" are generally sensitive to instruction. Comparison with the MRT is unsatisfactory. Further research to determine concurrent validity is required. However, use of a readiness test is not recommended, since this test would probably differentiate the children in this program from the non-special education population and not discriminate sufficiently among them.

These results suggest the usability of the PIPER for evaluation purposes for learning disabled children.

Follow-Up Validation of the Piper

The low validity coefficients that were obtained in the study necessitated the implementation of a follow-up study to determine further how PIPer objective test scores compare to teacher judgement for each objective.

Method

Subjects. The sample consisted of 78 children who were participating in the Bridge to School Program in 1979-1980. All of the children had been in Readiness kindergarten in 1978-1979 and were therefore known to the teacher rater.

Materials. Similar to the 1978-1979 study, each section of the PIPER was used. Within each section, each objective that had been previously selected by the 1978-1979 staff was again included on the rating form.

Procedure. A teacher workshop was held in September 1979 to discuss the findings of the 1978-1979 investigation and to instruct the staff in the implementation of the follow-up. Each teacher in the Bridge to School program was asked to select randomly eight to ten children who had been in the Readiness program during the preceding year and whose teacher was still in the Readiness program at that school. Last year's classroom teacher was to be asked to rate each child on each objective listed on the rating scale form. The rating consisted of designating mastery or nonmastery of each objective. During October Readiness teachers judged each child on the selected objectives while Bridge to School teachers determined each child's mastery/nonmastery using the PIPER tests. The data were placed on specially designed forms and transmitted to a computer center for keypunching.

Statistical Procedures. Phi coefficients were computed to determine the relationship between teacher judgment and the PIPER using SPSS.

Findings

All phi coefficients were exceedingly low, ranging from .01 to .56. Few were significant. See Table VII.

Discussion

The data did not support the use of the PIPER as an evaluation instrument since its validity was highly questionable. These findings supported the teachers who had used the PIPER during 1978-1979. At the September workshop, several teachers had criticized the PIPER and indicated their dissatisfaction with many of the objective tests. They specifically had stated that the items did not measure a child's ability to do the generalized task statement. They indicated that teaching to the task would result in mastery of the task but not necessarily mastery of the objective.

Conclusion and Recommendation

The PIPER cannot be used as an evaluative instrument since its validity is extremely weak. Another criterion referenced approach to evaluating student cognitive growth should be selected.

Since the program concentrates on prereading and reading skills, a criterion referenced reading test that emphasizes initial reading skills should be substituted for the PIPER which may still be used as an instructional method rather than a test.

TABLE VII VALIDITY: Teacher Judgment and PIPER

OBJECTIVES (N-181)	ϕ
Willows: Gross Motor Control	
Laterality	
Identifies left and right sides of body	.10
Positions body under, on top of, between in front of, behind, besides objects	.32
Positions body to the left or right of object	.15
Directionality	
Copies chalkboard circle/double circle	.28
Copies chalkboard lateral/vertical lines	.26
Sorts by concept of left and right	.00
Completes directional hand/foot movements	.43
Follows pegboard/paper directional tasks	.46
Sensory Usage	
Names objects using senses	.15
Gives sensory description of objects	.19
Compares/classifies by senses	.07
Windows: Visual Motor Processes	
Form constancy	
Sorts by color	.06
Sorts by texture	.06
Sorts by size	.35
Sorts by shape and pattern	.07
Figure ground	
Completes missing part pictures	.25
Finds hidden figures in drawings	.19
Spatial relationships	
Fits forms in formboard	.24
Reproduces two-dimensional block designs	.27
Reproduces three-dimensional block designs	.10
Reproduces bead patterns	.09
Reproduces parquetry patterns	.22
Reproduces pegboard patterns	.26
Completes maze pathways	.23
Assembles puzzles (strip/interlocking)	.33
Visual memory	
Recalls familiar objects	.20
Recalls familiar shapes	.16
Draws shapes from recall	.17
Resequences objects from memory	.16
Resequences colors from memory	.20
Copies exercises in sequence shown	.29
Reproduces bead patterns from memory	.06
Reproduces block designs from memory	.56
Draws patterns from recall	.37
Waves: Auditory Processes	
Discrimination	
Identifies rhyming words	.11
Identifies same/different word beginnings	.26
Identifies same/different word endings	.17
Identifies same/different medial sounds	.25
Memory	
Follow one-task directions	.26
Follow two-task directions in sequences	.10
Follow three-task directions in sequences	.24
Recreates a sequency of instrumental sounds	.15
Copies clapping/buzzboard patterns	.13
Repeats six word sentences	.13
Answers who/what/where/when questions about a selection	.26
Figure ground	
Responds to key word heard against background noise	.01
Supplies missing sound of dictated word	.26
Sound blending	
Blends syllables into words	.22
Blends letter sounds into words	.21

OBJECTIVES (N-181)	ϕ
Whispers: Language Skills	
Vocabulary Development	
Identifies objects as same or different	.11
Names groups as more or less	.08
Names objects presented in categories	.03
Matches and names colors	.06
Names basic shapes	.21
Names positional concepts	.42
Names oppositional traits of objects	.26
Defines objects in terms of use	.31
Recognizes multiple meanings of words	.14
Usage	
Speaks in complete sentences	.30
Counts objects	.24
Uses pronouns correctly in speech	.14
Uses tenses correctly in speech	.27
Uses plurals correctly in speech	.33
Can tell experience story to teacher	.21
Symbolization	
Matches letters to model of name	.23
Reads "yes" and "no"	.39
Gives sounds for selected letters	.19
Reads names of basic shapes	.39
Reads room labels	.33
Reads pictured action words	.42
Reads color words	.26
"Reads" experience story	.45
Wonders: Reasoning Abilities	
Learns through imitation: repeats model	.19
Learns by rote: repeats three facts	.20
Gives three facts about given experience	.13
Matches associated objects or events	.11
Matches related pairs of objects or events	.33
Sequences three four events in logical order	.33
Defines objects by their descriptive traits	.52
Categorizes/classifies objects and ideas	.03
Generalizes from familiar objects and events	.13
Makes comparisons based on fact	.28
Utilizes facts to propose alternatives	.35
Utilizes facts to make inferences	.32
Reasons inductively	.30
Reasons deductively	.32
Analyzes facts to make objective choices	.15